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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/611,907	07/03/2003	Jovan Jevtic	071469-0303359	5574
909	7590	12/03/2004	EXAMINER	
PILLSBURY WINTHROP, LLP			DEB, ANJAN K	
P.O. BOX 10500			ART UNIT	
MCLEAN, VA 22102			PAPER NUMBER	
			2858	

DATE MAILED: 12/03/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

10/611,907

Applicant(s)

JEVTIC ET AL.

Examiner

Anjan K Deb

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 03 July 2003.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1, 3 and 5-19 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1, 3, 5-19 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
- ☐ Certified copies of the priority documents have been received.
 - ☐ Certified copies of the priority documents have been received in Application No. _____.
 - ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☒ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date 07/03/2003.
- 4) ☐ Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____.
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: _____.

DETAILED ACTION

Response to Arguments

1. With respect to applicants argument rejection of claim 1 under 35 U.S.C 102(e) and applicant's amendment of claim 1 including "electrode disposed within the transmission line", the prior art Arndt (US 3,443,158) cited in this office discloses this feature along with the remaining claim 1 limitations. Therefore claim 1 is now rejected under 35 U.S.C 102(b) as being anticipated by Arndt (US 3,443,158).

In response to applicant's argument regarding rejection of claims 8, 16, 18, 19 under 35 U.S.C 103(a) that Miller (US 5,325,019) discloses a capacitive voltage probe 17 that surrounds the transmission line in order to electrostatically determine the voltage of the signal source 11, and that the particular capacitive voltage probe 17 is comprised of a metal tube which surrounds the RF transmission line which is separated from it by insulation, the Miller reference is applied in this office action in combination with Arndt (US 3,443,158) to provide a teaching that a transmission line probe having the claimed probe structure as taught by Arndt (US 3,443,158) that uses capacitance coupling may be used in high frequency application in order to electrostatically determine high frequency transmission line voltage signal.

In response to applicant's arguments regarding rejection of claims 9, 17 under 35 U.S.C 103(a) that Tarzwell lacks the use of an electrode that is disposed within the transmission line, spaced apart from the outer conductor, with a dielectric disposed between the electrode and the

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outer conductor and attached to the electrode, and an inner surface of the outer conductor, and has nothing to do with intra-transmission line voltage detection, the Tarzwell reference is applied in combination with Arndt (US 3,443,158) that discloses all of the above to indicate the desirability of sizing high frequency probes to less than one fourth signal wavelength long so as to minimize problems with discontinuities and reflections (column 1 lines 50-56) common to high frequency signal transmission.

The essence of this invention is a probe apparatus and method that may be used for controlling a plasma process wherein the probe comprises a transmission line having inner and outer conductor, and an electrode sized appropriately disposed within the transmission line spaced apart from outer conductor separated by a dielectric, the prior art combination disclosed in this office action discloses this feature.

Claim Rejections - 35 USC § 102

2. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

3. Claims 1, 3, 5-7, 10-15 are rejected under 35 U.S.C. 102(b) as being anticipated by Arndt (US 3,443,158).

Re claim 1, Arndt discloses voltage probe (Fig. 1) comprising a transmission line having an inner conductor 3, and an outer conductor 2, an electrode 21 (conductive surface 21

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embedded in insulation 4)(column 3 line 75, column 4 lines 1-3) spaced apart from the outer conductor 2 and a dielectric 4 disposed between the electrode 21 and the outer conductor 2 (forming capacitance C2), and lead (connected)(column 4 lines 3-8) in electrical communication with the electrode 21, the lead passing through an opening through each of the dielectric and the outer conductor (Fig. 1), wherein the dielectric is attached to the electrode (electrode embedded in insulation 4) and an inner surface of outer electrode.

Re claims 3,5 Arndt discloses voltage probe wherein each of the outer conductor 2 and the electrode 21 are curved (cylinder)(column 4 lines 1-3) wherein electrode overlies the dielectric and dielectric extends 4 outward beyond the edges of electrode 21 (Fig. 1).

Re claim 6, Arndt discloses voltage probe wherein the electrode 21 and the dielectric 4 are each configured as sections of cylindrical surfaces (column 4 lines 1-3) (Fig. 1).

Re claims 7, 13,15 Arndt discloses current probe (10)(Fig. 1,2) for measuring magnitude of current in the transmission line 3 (column 2 lines 57-64, column 4 lines 53-58).

Re claims 10-12, Arndt disclose voltage probe comprising second electrode 31 spaced from first electrode 21.

Re claim 14, Arndt disclose method of measuring a signal in a transmission line including an inner conductor 3 and outer conductor 2 comprising providing a dielectric 4 within the transmission line that is adjacent the outer conductor 2, providing an electrode 21 within the

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transmission line that is separated from the outer conductor 2 by the dielectric 4 and positioned adjacent to the dielectric 4, and measuring a signal from the electrode indicating (27,28) a transmission voltage in the transmission line (column 4 lines 18-27).

Claim Rejections - 35 USC § 103

4. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

5. Claims 8, 16, 18, 19 are rejected under 35 U.S.C. 103(a) as being unpatentable over Arndt (US 3,443,158) in view of Miller (US 5,325,019).

Re claim 8, Arndt discloses all of the claimed limitations as set forth above except current probe has characteristic wavelength and is positioned within a distance less than 3% of signal wavelength.

Miller discloses placing current probe proximate conductor, broadly interpreted as placing the current probe as close as possible to conductor carrying the signal to be measured for achieving maximum capacitive coupling (column 4 lines 45-52).

At the time of the invention it would have been obvious for one of ordinary skill in the art to modify Arndt by placing current probe as close as possible to conductor carrying the signal to be measured to maximize electric field coupling for measuring transmission line voltage by capacitive coupling.

Re claim 16 Arndt discloses measuring transmission line current and voltage but did not expressly disclose calculating power and impedance.

At the time of the invention it would have been obvious for one of ordinary skill in the art to modify Arndt by adding power calculation by the multiplication of measured voltage and current ($P=VI$) and impedance calculation from ohms law ($Z=V/I$) as these relations are well known in the art for measuring power delivered to a load and for fault location.

Re claims 18, Arndt discloses all of the claimed limitations as set forth above except controlling a plasma process comprising input radio frequency signal.

Re claim 18, Miller discloses (Fig. 2) method of controlling a plasma process, comprising providing an input radio frequency signal (RF POWER) to produce a plasma in a plasma generator 12, the radio frequency signal traveling in a transmission line 13 having an inner conductor and an outer conductor (coaxial cable), providing an electrode 17 separated from the outer conductor, providing a dielectric (insulation) adjacent the outer conductor (column 4 lines 39-45), receiving a signal from the electrode indicating voltage of the radio frequency signal (column 4 lines 56-61) and adjusting the input signal (electrical excitation level)(see abstract lines 4-9) in response to the received signal from the electrode (column 2 lines 12-17).

Re claim 19, Miller discloses method of controlling a plasma process further comprising measuring a current of radio frequency signal, and adjusting the input signal (electrical excitation level) in response to the measured current (see abstract lines 4-9, and column 2 lines 12-17).

At the time of the invention it would have been obvious for one of ordinary skill in the art to modify Arndt by adapting the probe disclosed by Arndt for use in controlling plasma process comprising radio frequency input signal as disclosed by Miller for monitoring and controlling a plasma process.

6. Claim 9, is rejected under 35 U.S.C. 103(a) as being unpatentable over Arndt (US 3,443,158) in view of Tarzwell (US 5,982,187).

Re claim 9, Arndt disclosed all of the claimed limitations as set forth above except that the size of electrode is small compared to one-fourth of signal wavelength.

Tarzwell discloses the desirability of having a size of a high frequency probe which is less than one tenth of the signal wavelength long so as to minimize problems with discontinuities and reflections (column 1 lines 50-56) common to high frequency signal transmission.

At the time of the invention it would have been obvious for one of ordinary skill in the art to modify Arndt by adding electrode having a length smaller than one-fourth of signal wavelength as disclosed by Tarzwell so as to minimize inductive couplings causing discontinuities and reflections along the length of probe and thus minimize loss of signal strength measured by probe making the probe suitable for high frequency measurements.

7. Claim 17, is rejected under 35 U.S.C. 103(a) as being unpatentable over Arndt (US 3,443,158) in view of Miller (US 5,325,019), and further in view of Tarzwell (US 5,982,187).

Re claim 17, Arndt and Miller disclosed all of the claimed limitations as set forth above except that the size of electrode is small compared to one-fourth of signal wavelength.

Tarzwel discloses the desirability of having a size of a high frequency probe which is less than one tenth of the signal wavelength long so as to minimize problems with discontinuities and reflections (column 1 lines 50-56) common to high frequency signal transmission.

At the time of the invention it would have been obvious for one of ordinary skill in the art to modify Arndt and Miller by adding electrode having a length smaller than one-fourth of signal wavelength as disclosed by Tarzwel so as to minimize inductive couplings causing discontinuities and reflections along the length of probe and thus minimize loss of signal strength measured by probe making the probe suitable for high frequency measurements.

Conclusion

8. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.

Carlile (US 5,339,039) discloses probe (FIG. 2) for radio frequency excited plasma processing system (Fig. 1) comprising Langmuir probe system 21 comprising transmission line having inner conductor 23, outer conductor 27, dielectric (insulating cylinder) 26, capacitive element (43,48)(electrode)(Fig. 4), and leads (54,61) in electrical communication with electrode (43,48) (Fig. 2). The probe provides current and voltage information for determining plasma internal discharge parameters.

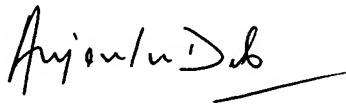
Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire **THREE MONTHS** from the mailing date of this action. In the event a first reply is filed within **TWO MONTHS** of the mailing date of this final action and the advisory action is not mailed until after the end of the **THREE-MONTH** shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than **SIX MONTHS** from the date of this final action.

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Contact Information

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Dr. Anjan K. Deb whose telephone number is 571-272-2228. If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, N. Le, can be reached at (571) 272-2233.



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